

Development of Nutrient Criteria in New Mexico, 2009

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Starting with streams

In New Mexico, numeric translator values for TN, TP and chlorophyll a have been developed using the percentile approach laid out in EPA guidance documents.

These values are part of a weight of evidence approach used in SWQB's nutrient assessment protocols for streams.

The TN & TP values were developed in the following manner:

- Data were compiled from the national nutrient dataset (1990-1997), STORET (1998), and NMED SQWB In-House Database (1999-2005). Parameters included TP, Total Kjeldahl Nitrogen (TKN), and Nitrate Plus Nitrite (N+N)
- GIS coverages were used to assign Omernik ecoregions and aquatic life uses (ALU)
- The data were divided first by ecoregion then by ALU and the 50th percentile was calculated for each parameter: TP, Total Kjeldahl Nitrogen (TKN), and Nitrate Plus Nitrite (N+N)
- The TKN and N+N values were then added together for TN

Ecoregion and Aquatic Life Use

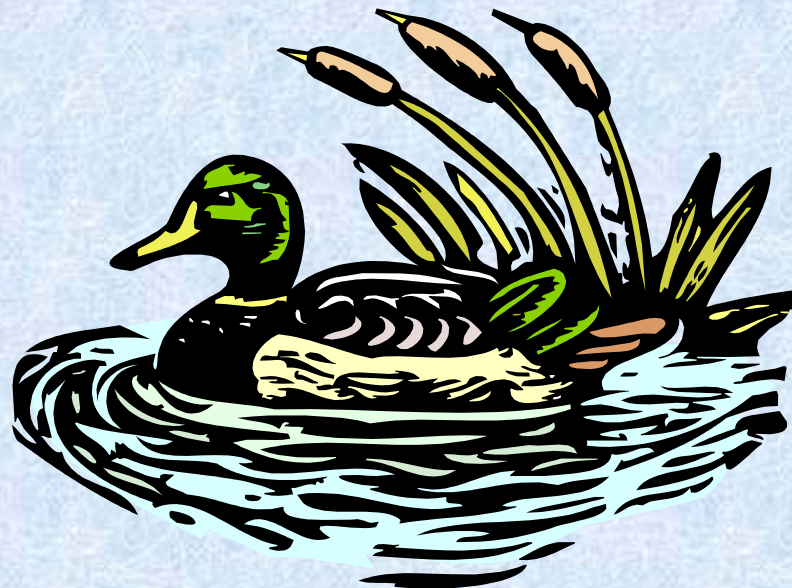
Nutrient Thresholds for Streams (mg/L), using regional data and the 50th percentile

	21 – Southern Rockies		22 – AZ/NM Plateau		23 – AZ/NM Mountains		24 – Chihuahuan Desert	26 – Southwest Tablelands		
TN	0.25		0.35		0.25		0.53	0.38		
TP	0.02		0.05		0.02		0.04	0.03		
A L U	CW	T – WW (volcanic)	CW	T – WW	CW	T – WW	T – WW	CW	T	WW
TN	0.25	0.25	0.28	0.48	0.25	0.29	0.53	0.25	0.38	0.45
TP	0.02	0.02 (0.05)	0.04	0.09	0.02	0.05	0.04	0.02	0.03	0.03

CW = Coldwater Aquatic Life Use
T = Transitional Aquatic Life Use
WW = Warmwater Aquatic Life Use

Ecoregional Chlorophyll *a* threshold values (95th percentile of reference sites) in $\mu\text{g}/\text{cm}^2$

21- Southern Rockies	22/20- AZ/NM Plateau	23- AZ/NM Mountains	24/79- Chihuahuan Desert	26/25- Southwest Tablelands
5	8	7	17	11



In addition to the ecoregions and designated use based nutrient criteria for TN and TP the following response variables are or will be used in assessing nutrient impairment of the State's streams and rivers:

- **Dissolved Oxygen**
 - **Concentration** (assessed with large data set protocol) or
 - **Dissolved Oxygen Saturation**
- **pH** (assessed with large data set protocol)
- **Chlorophyll *a* Concentration**
- **Benthic Macroinvertebrates Stream Community Index and/or Hilsenhoff Biotic Index**
(still under development)
- **Nutrient Diatom Index** *(still under development)*

SWQB has provided PANS with 330 stream and river periphyton samples. These data are currently being analyzed and we will have draft indices by June 2009.

Implementation Concerns

- Percentile-derived threshold values are fair indicators of nutrient enrichment when used with other parameters in a weight of evidence approach.
- However, these values are also used as numeric translators for TMDLs and NPDES permits, and potentially for numeric criteria but they are:
 - Currently not tied to impairment
 - Considerably lower than what is technologically achievable for WWTPs

Are they suitable for these applications ???

Lakes and Reservoirs





Lakes Dataset Compilation (nearly complete)



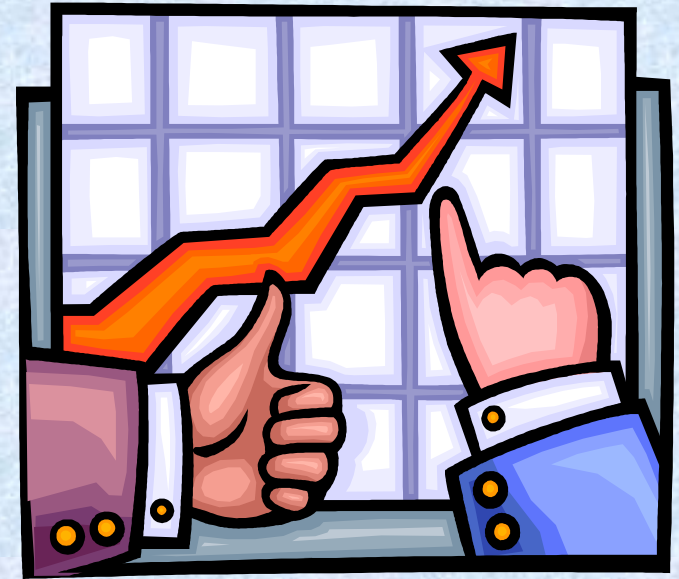
- In 2006 and 2007, SWQB sampled 25 lakes and reservoirs, including cirque lakes, sink holes, and warm and coldwater reservoirs and this has been added to the historic dataset,
 - Water quality data from 2000-2007 in the SWQB Database
 - Water quality data from 1989-1999 in Archival STORET
- In addition to a number of classification parameters such as watershed size and ecoregion, the compiled variables include:
 - Total Phosphorus
 - Total Kjeldahl N
 - Nitrate Plus Nitrite
 - Secchi depth
 - **Chlorophyll *a* concentration**
 - **Phytoplankton Community Comp.**
 - **Diatom Community Comp.**
 - **Dissolved Oxygen**

Use Support Rating

SWQB will attempt to develop a use support rating for reservoirs based on a number of parameters such as:

- Fish community conditon
- Frequency of fish kills
- Extent of anoxic conditions
- Diatom index

The nutrient variables will then be compared to the use support rating to identify the thresholds at which the use is impaired.



Rivers ???

Rio Grande near Colorado New
Mexico boarder



Preliminary River Definition

- SWQB is distinguishing rivers from streams by defining systems that cannot be monitored effectively with the biological and habitat methods developed for wadeable streams. These rivers also generally meet the Simon and Lyons (1995) definition of great rivers as those having drainage areas greater than 2,300 square miles. There are many systems in New Mexico that meet the great river definition but are suitable to wadeable streams monitoring methods due to the arid nature of the region.
- The systems currently included in the "rivers" waterbody type are:
 - The San Juan River from below Navajo Reservoir to the Colorado border
 - The Rio Grande in New Mexico,
 - The Pecos River from below Sumner Reservoir to the Texas border,
 - The Rio Chama from below El Vado Reservoir to the Rio Grande,
 - The Canadian River below the confluence with the Cimarron River,
 - The Rio Puerco below the confluence with the Rio San Jose, and
 - The Gila River below Mogollon Creek.

SWQB is currently compiling a dataset for this waterbody type to be analyzed for applicable nutrient threshold values

SWQB will use multivariate analysis to determine how these systems group with respect to diatom community composition

THE END

<http://www.nmenv.state.nm.us/swqb/Nutrients/index.html>

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